

Dendrite Array Disruption by Bubbles during Re-melting in a Microgravity Environment

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Abstract

As part of the Pore Formation and Mobility Investigation (PFMI), Succinonitrile –Water “alloys” consisting of aligned dendritic arrays were re-melted prior to conducting directional solidification experiments in the microgravity environment aboard the International Space Station. Thermocapillary convection initiated by bubbles at the solid-liquid interface during controlled melt back of the alloy was observed to disrupt the initial dendritic alignment. Disruption ranged from detaching large arrays to the transport of small dendrite fragments at the interface. The role of bubble size and origin is discussed along with subsequent consequences upon reinitiating controlled solidification.